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REMARKS

The Official Action dated January 19, 2007 has been received and its contents carefully noted. In view thereof, claims 1, 5, 11 and 14 have been amended in order to better define that which Applicants regard as the invention. As previously, claims 1, 2, 4, 5, and 7-14 are presently pending in the instant application.

Turning now to the Official Action and particularly page 2 thereof, claims 1, 2, 4, 5 and 7-14 have been rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. Specifically, the Examiner states that the phrase "more than 0% and 5% or less" is new matter. That is, the specification recites 5% or less; however, the specification does not recite "more than 0%". In this regard, as can be seen from the foregoing amendments each of claims 1, 5, and 11 (as claim 14 did not include such limitation) have been amended to delete reference to the phrase "more than 0% and 5% or less". Accordingly, it is respectfully submitted that Applicants' claimed invention is now in proper formal condition for allowance.

In paragraph 3 of the Office Action, claims 1, 2, 4, 5 and 7-14 have again been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,168,726 issued to Li et al. in view of U.S. Patent No. 6,485,988 issued to Ma et al. as evidenced by U.S. Patent No. 6,054,379 issued to Yau et al. Again, this rejection is respectfully traversed in that the combination proposed by the Examiner neither discloses nor suggests that which is presently set forth by Applicants' claimed invention.

As can be seen from the foregoing amendments, each of independent claims 1, 5 and 11 have been amended in order to clearly recite a first plasma etching step and a second plasma etching step, this feature being previously set forth in independent claim 14. That is, with the foregoing amendments each of independent claims 1, 5 and 11 have been amended to recite a second step of plasma etching or performing a second step of plasma etching on the organic/inorganic hybrid film as recited in claims 1 and 5 or on the inner layer insulating film as recited in independent claim 11, with the second step of plasma etching being carried out after the first step and utilizing a nitrogen free etching gas containing fluorine and carbon. It is respectfully submitted that the combination proposed by the Examiner, fails to disclose or remotely suggest this feature. Support for the foregoing amendments as well as the advantages associated therewith are set forth around Applicants' specification and particularly at page 54, lines 10-24.

Therein, in order to overcome problems associated with the prior art set forth in Applicants' specification, during the etching for the entire organic/inorganic hybrid film 104, it is preferably to use an etching gas containing fluorine, carbon and nitrogen before the etching of its final stage. At the final stage of the etching, an etching gas containing fluorine and carbon but containing no nitrogen is preferably used. In this way, the organic/inorganic hybrid film 104 can be etched at a high etching rate while the surface portion thereof is being reformed before the final stage of the etching. At the final stage of etching, the already reformed surface portion can be etched without increasing the specific dielectric constant. Thus, the entire etching process, the etching rate can be improved without increasing the specific dielectric constant. It is respectfully submitted that the combination proposed by the Examiner clearly fails to disclose or remotely suggest these particular features.

As the Examiner notes, Li et al. discloses etching an organic/inorganic hybrid film using Black Diamond (column 3, line 52), i.e., using a low-k film as a dielectric over interconnects. Li et al. further discloses carrying out first and second etching steps to form contact holes of high aspect ratio using a carbon-volatizing gas so as not to cause etching stop and the gas as noted from column 12, line 57 can include oxygen gas or nitrogen gas. It is further noted that Li et al. states that the etching gas may include the nitrogen gas in both the first and second etching steps or only in the second etching step whereas in accordance with Applicants' claimed invention a nitrogen gas is introduced in the first etching step, the step leading up to the final stage of etching in order to reform and etch the surface of the organic/inorganic hybrid film and nitrogen gas is not introduced in the second etching step or final etching step in order to perform etching on the surface already etched without increasing the relative permittivity. Accordingly, as the Examiner can readily appreciate the objective, structure and method of the present invention is different from that of the teachings of Li et al.

The Examiner further notes that Ma et al. discloses using a low-k material for the dielectric layer 408 formed above the ferroelectric capacitor set forth therein. It is further noted that Ma et al. states that a hydrogen free etching gas is used when forming contacts in the dielectric layer to come in contact with the ferroelectric capacitor (as noted from column 5, lines 10-42) and lists fluorine, carbon, nitrogen as well as others as a material comprising the hydrogen free etching. However, it is noted that Ma et al. fails to disclose or remotely suggest the two particular etching steps set forth in accordance with Applicants' claimed invention. Accordingly, it is respectfully submitted that Ma et al. does nothing to overcome the aforementioned shortcomings associated with the teachings of Li et al.

It is noted on page 4 of the Office Action that the Examiner further relies on the teachings of Yau et al. as evidencing the fact that Li et al. teaches organic silane that may contain a methyl group. While this may be the case, it is respectfully submitted that Yau et al. does nothing to overcome the significant shortcomings associated with the teachings of Li et al. when taken alone or in view of Ma et al.

Further, it is noted that with respect to claim 14 the Examiner is of the position that Ma et al. teaches that an etching gas may contain fluorine and carbon, and may be additionally, comprised of nitrogen. The Examiner further goes on to state that it would have been obvious to one of ordinary skill in the art to use etchant with nitrogen or without nitrogen or combination thereof (such as applying two methods sequentially), which is considered to read on limitations of instant claim 14. However, in that the patent to Li et al. clearly states that the etchant gas may include a nitrogen gas in both of the first and second etching steps or only the second etching step, for the Examiner to summarily state that it would be obvious to one of ordinary skill in the art in view of the teachings of Ma et al. or Yau et al. to perform a second etching step utilizing a nitrogen free etching gas is clearly contrary to the essence of Li et al. and thus the combination proposed by the Examiner to achieve that which is presently set forth by Applicants' claimed invention is clearly improper.

Therefore, in view of the foregoing it is respectfully requested that the rejections of record be reconsidered and withdrawn by the Examiner, that claims 1, 2, 4, 5 and 7-14 be allowed and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,

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